LOW-FIELD MRI

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/193,041 entitled "Low-Field MRI," filed March 29, 2000.

STATEMENT AS TO FEDERALLY SPONSORED RESEARCH

This invention was made with U.S. Government support under National Science Foundation grant No. 9813777. The government has certain rights in the invention.

FIELD OF THE INVENTION

This invention relates to magnetic resonance imaging and more particularly to magnetic resonance imaging in low-strength magnetic fields.

BACKGROUND OF THE INVENTION

Magnetic Resonance Imaging (MRI) measures the presence of polarized particles within objects and processes these measurements into images showing the location and concentrations of the particles. A magnetic field is applied to an object to align the particles within the object along a direction of the magnetic field. Once the particles are aligned, the object is subjected to a radio frequency (RF) pulse with or without using magnetic field gradients. This pulse deflects the particles from their axis. In returning to their axes (i.e., during relaxation), the particles emit a signal that can be measured by magnetic field receptors, such as coils. The detected signals are used to produce images of the object.

Some noble gases are both effective anesthetic agents and suitable for use in MRI systems. One noble gas with known anesthetic properties that has been approved for use in humans is Xenon. In addition, ^{129}Xenon (^{129}Xe) has non-zero nuclear spin, making ^{129}Xenon theoretically suited to MRI. The small magnetic moment, however, of